

REMARKS

The Office Action mailed August 23, 2005, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1, 3-7, and 9-20 are now pending in this application. Claims 1-20 stand rejected. Claims 2 and 8 have been canceled.

The rejection of Claims 1, 4-7, 10-12, 14, and 17-19 under 35 U.S.C. § 102(b) as being anticipated by Winstanley et al. (U.S. Pat. No. 5,246,340) is respectfully traversed.

Winstanley et al. describe an internally-cooled hollow blade (14) for use with a gas turbine engine (10). The blade (14) includes a plurality of ribs (38, 40, 42, 46, 48, and 50) which each extend across the interior of blade (14) between the blade pressure and suction sidewalls (22 and 24, respectively). The ribs (38, 40, 42, 46, 48, and 50) define a plurality of internal cavities (52, 54, 56, 58, 60, 62, 64, and 66) that extend chord-wise from a leading edge (18) to a trailing edge (20) of blade (14). A plurality of passages (39, 41S, 41P, 43P, 43S, 45, 47, 49, and 51) extend through the ribs (38, 40, 42, 46, 48, and 50) to facilitate delivery of cooling air flow to adjacent cavities (52, 54, 56, 58, 60, 62, 64, and 66) in a general chordwise flow direction. The blade (14) includes a plurality of exhaust apertures (68, 70, and 72) which exhaust spent cooling air from the interior cavities (52, 54, 56, 58, 60, 62, 64, and 66) to the exterior of the blade. Notably, Winstanley et al. do not describe nor suggest defining either a pressure side cooling circuit and/or a suction side cooling circuit.

Claim 1 a method of fabricating a rotor blade for a gas turbine engine, wherein the rotor blade includes an airfoil having a first sidewall and a second sidewall connected together at a leading edge and a trailing edge, such that a cavity is formed therebetween, wherein the method comprises “forming a plurality of rib walls that extend at least partially between the first and second sidewalls, wherein the rib walls define at least one cooling circuit, wherein each cooling circuit includes at least three cooling chambers . . . forming at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers . . . such that at least one of a pressure side circuit and a suction side circuit is formed.”

Winstanley et al. do not describe nor suggest a method of fabricating a rotor blade for a gas turbine engine as is recited in Claim 1. Specifically, Winstanley et al. do not describe nor suggest forming at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers such that at least one of a pressure side circuit and a suction side circuit is formed. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Winstanley et al.

Claim 4 depends from independent Claim 1. When the recitations of Claim 4 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 4 likewise are patentable over Winstanley et al.

Claim 7 recites an airfoil for a gas turbine engine, wherein the airfoil comprises “a first sidewall and a second sidewall coupled together at a leading edge and a trailing edge, such that a cavity is defined therebetween . . . a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls defining at least one cooling circuit having at least three cooling chambers and comprising a pressure side cooling circuit and a suction side cooling circuit”

Winstanley et al. do not describe nor suggest an airfoil for a gas turbine engine as is recited in Claim 7. Specifically, Winstanley et al. do not describe nor suggest a plurality of rib walls that define at least one cooling circuit having at least three cooling chamber and that define a pressure side cooling circuit and a suction side cooling circuit. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction. Accordingly, for at least the reasons set forth above, Claim 7 is submitted to be patentable over Winstanley et al.

Claims 10-12 depend from independent Claim 7. When the recitations of Claims 10-12 are considered in combination with the recitations of Claim 7, Applicants submit that dependent Claims 10-12 likewise are patentable over Winstanley et al.

Claim 14 recites a gas turbine engine comprising “a plurality of rotor blades, each said rotor blade comprising an airfoil comprising a leading edge, a trailing edge, a first sidewall and a second sidewall coupled together at said leading and trailing edges such that a cavity is defined therebetween, a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls define at least one purge chamber . . .”

Winstanley et al. do not describe nor suggest a gas turbine engine as is recited in Claim 14. Specifically, Winstanley et al. do not describe nor suggest a plurality of rib walls that define at least one purge chamber. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction. Accordingly, for at least the reasons set forth above, Claim 14 is submitted to be patentable over Winstanley et al.

Claims 17-19 depend from independent Claim 14. When the recitations of Claims 17-19 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 17-19 likewise are patentable over Winstanley et al.

For at least the reasons set forth above, Applicant respectfully requests that the Section 102 rejection of Claims 1, 4-7, 10-12, 14, and 17-19 be withdrawn.

The rejection of Claims 2, 3, 8, 9, 15, and 16 under 35 U.S.C. § 103(b) as being unpatentable over Winstanley et al. in view of Corsmeier (U.S. Pat. No. 5,813,835) is respectfully traversed.

Winstanley et al. is described above. Corsmeier describes an internally-cooled turbine blade (16) that includes a concave sidewall (18) and a convex sidewall (20). The blade (16) also includes a pair of serpentine side cooling passages (22 and 24), a middle cooling passage (26), a trailing edge cooling passage (30), and a leading edge cooling passage

(28). Air is admitted to blade (10) through its root (12) and is channeled to various cooling passages (22, 24, 26, 28, and 30). Air entering passage (22) exits blade (10) through an orifice (52) and facilitates cooling concave side (18). Air within cooling passage (28) is ejected through film cooling holes (29) to facilitate cooling leading edge (17). Air within trailing edge cooling passage (30) is ejected across a trailing edge (19) of blade (10). Notably, Corsmeier does not describe nor suggest a purge cavity. Moreover, and notably, Corsmeier does not describe nor suggest defining at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers.

Applicants respectfully submit that the Section 103 rejection of presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to combine Corsmeier with Winstanley et al. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, “to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the Applicant.” In re Kotzab, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, as is well established, the mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. See In re Gordon, 221 U.S.P.Q.2d 1125 (Fed. Cir. 1984). Furthermore, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, there must be some suggestion, outside of Applicant’s disclosure, in the prior art to combine such references, and a reasonable

expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown.

Accordingly, since there is no teaching nor suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection of Claims 2, 3, 8, 9, 15, and 16 be withdrawn.

Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Specifically, Applicants respectfully submit that Corsmeier teaches away from the present invention and from Winstanley et al., and as such, thus supports the nonobviousness of the present invention. More specifically, in contrast to the present invention and to Winstanley et al., Corsmeier clearly describes an airfoil wherein the ribs are not formed with openings extending therethrough that couple adjacent cooling chambers together in flow communication. As such, the presently pending claims are patentably distinguishable from the cited combination.

In addition, no combination of Winstanley et al. and Corsmeier describes or suggests the claimed invention. Specifically, Claim 1 recites a method of fabricating a rotor blade for a gas turbine engine, wherein the rotor blade includes an airfoil having a first sidewall and a second sidewall connected together at a leading edge and a trailing edge, such that a cavity is formed therebetween, wherein the method comprises "forming a plurality of rib walls that extend at least partially between the first and second sidewalls, wherein the rib walls define at least one cooling circuit, wherein each cooling circuit includes at least three cooling chambers . . . forming at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers . . . such that at least one of a pressure side circuit and a suction side circuit is formed."

No combination of Winstanley et al. and Corsmeier describes nor suggests a method of fabricating a rotor blade for a gas turbine engine as is recited in Claim 1. Specifically, no combination of Winstanley et al. and Corsmeier describes nor suggests forming at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers such that at least one of a pressure side circuit and a suction side circuit is formed. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction, and Corsmeier describes an airfoil which does not include any openings within at least one rib wall that extends between adjacent cooling chambers. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Winstanley et al. in view of Corsmeier.

Claim 2 has been canceled. Claim 3 depends from independent Claim 1. When the recitations of Claim 3 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 3 likewise is patentable over Winstanley et al. in view of Corsmeier.

Claim 7 recites an airfoil for a gas turbine engine, wherein the airfoil comprises “a first sidewall and a second sidewall coupled together at a leading edge and a trailing edge, such that a cavity is defined therebetween . . . a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls defining at least one cooling circuit having at least three cooling chambers and comprising a pressure side cooling circuit and a suction side cooling circuit”

No combination of Winstanley et al. and Corsmeier describes nor suggests an airfoil for a gas turbine engine as is recited in Claim 7. Specifically, no combination of Winstanley et al. and Corsmeier describes nor suggests a plurality of rib walls that define at least one cooling circuit having at least three cooling chamber and that define a pressure side cooling circuit and a suction side cooling circuit. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction, and Corsmeier describes an airfoil which does not include

any openings within at least one rib wall that extends between adjacent cooling chambers. Accordingly, for at least the reasons set forth above, Claim 7 is submitted to be patentable over Winstanley et al. in view of Corsmeier.

Claim 8 has been canceled. Claim 9 depends from independent Claim 7. When the recitations of Claim 9 are considered in combination with the recitations of Claim 7, Applicants submit that dependent Claim 9 likewise is patentable over Winstanley et al. in view of Corsmeier.

Claim 14 recites a gas turbine engine comprising “a plurality of rotor blades, each said rotor blade comprising an airfoil comprising a leading edge, a trailing edge, a first sidewall and a second sidewall coupled together at said leading and trailing edges such that a cavity is defined therebetween, a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls define at least one purge chamber . . .”

No combination of Winstanley et al. and Corsmeier describes nor suggests a gas turbine engine as is recited in Claim 14. Specifically, no combination of Winstanley et al. and Corsmeier describes nor suggests a plurality of rib walls that define at least one purge chamber. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction, and Corsmeier describes an airfoil which does not include any openings within at least one rib wall that extends between adjacent cooling chambers. Accordingly, for at least the reasons set forth above, Claim 14 is submitted to be patentable over Winstanley et al. in view of Corsmeier.

Claims 15 and 16 depend from independent Claim 14. When the recitations of Claims 15 and 16 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 15 and 16 likewise are patentable over Winstanley et al. in view of Corsmeier.

For at least the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 2, 3, 8, 9, 15, and 16 be withdrawn.

The rejection of Claims 13 and 20 under 35 U.S.C. § 103(b) as being unpatentable over Winstanley et al. in view of Jackson (U.S. Pat. No. 5,820,337) is respectfully traversed.

Winstanley et al. is described above. Jackson describes a double wall hot gas path (50) for use in turbine components, such as an airfoil (16). Airfoil (16) includes a partially hollow support wall (40) and a skin (42). Support wall (40) extends longitudinally through the airfoil (16) and includes a plurality of channels (46) that are formed in a shaped outer surface (48) of wall (40). Skin (42) substantially conforms to shaped outer surface (48) such that channels (46) are bordered at least partially by an inner surface of skin (42). The combination of skin (42) and support wall (40) forms double wall structure (50). Hollow regions (54) are defined within support wall (40). Jackson recites at column 5, lines 7-11, that “[h]ollow regions 5, as well as integral internal channels 52 may be used . . . to circulate a cooling gas (not shown), such as air, within airfoil 16 in order to cool these articles. Notably, Jackson does not describe nor suggest a purge cavity. Moreover, and notably, Jackson does not describe nor suggest defining at least one row of openings within at least one of the rib walls extending between adjacent cooling chambers.

Applicants respectfully submit that the Section 103 rejection of presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to combine Jackson with Winstanley et al. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, “to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the Applicant.” In re Kotzab, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, as is well established, the mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. See In re Gordon, 221 U.S.P.Q.2d 1125 (Fed. Cir. 1984). Furthermore, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot

use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, there must be some suggestion, outside of Applicant’s disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant’s disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown.

Accordingly, since there is no teaching nor suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection of Claims 13 and 20 be withdrawn.

Moreover, if art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Specifically, Applicants respectfully submit that Jackson teaches away from the present invention and from Winstanley et al., and as such, thus supports the nonobviousness of the present invention. More specifically, in contrast to the present invention and to Winstanley et al., Jackson clearly describes an airfoil that does not includes any ribs formed with openings extending therethrough that couple adjacent cooling chambers together in flow communication. As such, the presently pending claims are patentably distinguishable from the cited combination.

In addition, no combination of Winstanley et al. and Jackson, describes nor suggests an airfoil for a gas turbine engine as is recited in the claims of the present invention.

Specifically, Claim 7 recites an airfoil for a gas turbine engine, wherein the airfoil comprises “a first sidewall and a second sidewall coupled together at a leading edge and a trailing edge, such that a cavity is defined therebetween . . . a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls defining at least one cooling circuit having at least three cooling chambers and comprising a pressure side cooling circuit and a suction side cooling circuit”

No combination of Winstanley et al. and Jackson describes nor suggests an airfoil for a gas turbine engine as is recited in Claim 7. Specifically, no combination of Winstanley et al. and Jackson describes nor suggests a plurality of rib walls that define at least one cooling circuit having at least three cooling chamber and that define a pressure side cooling circuit and a suction side cooling circuit. Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction, and Jackson describes an airfoil which does not include any openings within at least one rib wall that extends between adjacent cooling chambers. Accordingly, for at least the reasons set forth above, Claim 7 is submitted to be patentable over Winstanley et al. in view of Jackson.

Claim 13 depends from independent Claim 7. When the recitations of Claim 13 are considered in combination with the recitations of Claim 7, Applicants submit that dependent Claim 13 likewise is patentable over Winstanley et al. in view of Jackson.

Claim 14 recites a gas turbine engine comprising “a plurality of rotor blades, each said rotor blade comprising an airfoil comprising a leading edge, a trailing edge, a first sidewall and a second sidewall coupled together at said leading and trailing edges such that a cavity is defined therebetween, a plurality of rib walls extending at least partially between said first and second sidewalls, said plurality of rib walls define at least one purge chamber”

No combination of Winstanley et al. and Jackson describes nor suggests a gas turbine engine as is recited in Claim 14. Specifically, no combination of Winstanley et al. and Jackson describes nor suggests a plurality of rib walls that define at least one purge chamber.

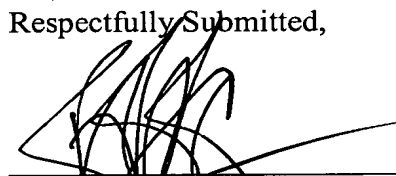
Rather, in contrast to the present invention, Winstanley et al. describe a hollow blade that includes a plurality of chordwise spaced cavities that each extend between the pressure and suction sidewalls and are coupled serially together in flow communication to facilitate a cooling air flow through the blade only in a general chordwise flow direction, and Jackson describes an airfoil which does not include any openings within at least one rib wall that extends between adjacent cooling chambers. Accordingly, for at least the reasons set forth above, Claim 14 is submitted to be patentable over Winstanley et al. in view of Jackson.

Claim 20 depends from independent Claim 14. When the recitations of Claim 20 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claim 20 likewise is patentable over Winstanley et al. in view of Jackson.

For at least the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 13 and 20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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